

Mekong Malaria and Filariasis

Principal Investigator:

Dr. Richard Kiang
NASA Goddard Space Flight Center
Greenbelt, MD 20771
(301) 614-5375

richard.kiang@gsfc.nasa.gov

A multidisciplinary, international collaborative effort to combat malaria and filariasis in the Greater Mekong Subregion using remote sensing technologies.



At 4,200 km, the Mekong River is the world's tenth longest river. It influences directly or indirectly the lives of hundreds of millions of inhabitants in its basin. The riparian countries – Thailand, Myanmar, Cambodia, Laos, Vietnam, and a small part of China – form the Greater Mekong Subregion (GMS). This geographical region has the misfortune of being the world's epicenter of falciparum malaria, the most severe form of malaria caused by the *Plasmodium falciparum*. Depending on the country, approximately 50% to 90% of all malaria cases are due to this species. Already resistant to multiple antimalarial drugs, the parasite may induce kidney failure, coma, and death. The majority of the victims are young children, pregnant women, and people with depressed immunoresponse. In spite of extensive international efforts, progress in malaria treatment and control in the GMS has been limited. In March 2001, NASA established a collaborative project with Mahidol University (Bangkok, Thailand) after the university made an urgent request for assistance in malaria control using remote sensing technologies. The collaboration was later extended to filariasis, as the same remote sensing technology used in malaria control can be applied here. While less deadly than malaria, approximately 40 million people are disfigured or disabled by lymphatic filariasis worldwide. WHO is determined to eradicate filariasis. However, remote sensing is still largely unknown to the community as a viable method for disease control.



Collecting larvae

Mahidol University is Thailand's premier university. Its Faculty of Tropical Medicine is internationally recognized for its work on malaria treatment, control and monitoring. The Faculty is the seat of the Southeast Asian Ministers of Education Organization's Regional Center for Tropical Medicine (SEAMEO TROPMED), and a leader in promoting malaria control in Southeast Asia. Also located in Bangkok, Thailand is the Armed Forces Research Institute of Medical Sciences (AFRIMS), the Department of Defense's preeminent medical facility established nearly four decades ago. NASA has started to participate in AFRIMS' malaria studies in 2002 to draw upon its long experience in malaria research, and also to assist its scientists in gaining expertise in the use of remote sensing for disease control. Other participants in the AFRIMS study team are from the Uniformed Services University of Health Sciences (USUHS), US Army Medical Research Institute of Infectious Diseases (USAMRIID), Cornell University, University of California at Davis, and University of North Dakota. Hence the outcome of NASA's involvement will not only reduce the mortality and morbidity in the GMS populace, but will also benefit the US forces overseas, enhance the Department of Defense's medical capability, and promote malaria research in academia.

The objectives of this project are

1. To identify the potential breeding sites of major vector species and the locations for larvicide and insecticide applications in order to reduce costs, lessen the chance of developing pesticide resistance, and minimize the damage to the environment;
2. To develop a malaria transmission model characterizing the interactions among hosts, vectors, parasites, landcover and environment in order to identify the key factors that sustain or intensify malaria transmission; and
3. To develop a risk model to predict the occurrence of malaria and its transmission intensity using epidemiological data and satellite-derived or ground-measured environmental and meteorological data.

Satellite data with high spatial resolution, such as Ikonos or Landsat, will be used for habitat mapping. Meteorological data are obtained from NASA and NOAA satellites, or from surface network in case higher spatial resolution is needed.

Partners:

- NASA/GSFC
- Mahidol University, Bangkok, Thailand
- The AFRIMS team

Contact:

Dr. Richard Kiang
NASA Goddard Space Flight Center
Greenbelt, MD 20771
(301) 614-5375

richard.kiang@gsfc.nasa.gov